

AMENDMENTS TO THE CLAIMS

1 1. (Original) A method for determining a logical path in a managed network between a
2 source device and a destination device at a data link layer, the method comprising the
3 computer-implemented steps of:
4 creating and storing a Connected Group Space representation of network devices
5 based on a topology space representation of the network devices;
6 identifying an optimized path in the Connected Group Space representation;
7 transforming the optimized path into the topology space representation; and
8 creating and storing the optimized path that was transformed into the topology space
9 representation as the data link layer path.

1 2. (Original) The method as recited in Claim 1, wherein the managed network is a
2 managed IP network.

1 3. (Original) The method as recited in Claim 1, wherein the step of creating and storing
2 a Connected Group Space representation further comprises the steps of:
3 identifying a set of Connected Group nodes associated with the Connected Group
4 Space representation;
5 identifying Connected Group links that connect the Connected Group nodes; and
6 creating and storing information that represents the Connected Group links.

1 4. (Original) The method as recited in Claim 1, wherein the step of creating and storing
2 a Connected Group Space representation further comprises the steps of:
3 identifying a subnet associated with the source device and the destination device;

4 determining a set of network links that link one or more network devices in the
5 managed network; and
6 determining an assignment of ports of network devices.

1 5. (Original) The method as recited in Claim 1, wherein the step of creating and storing
2 a Connected Group Space representation further comprises the steps of:
3 identifying all Virtual Local Area Networks (VLANs) associated with a subnet
4 associated with the source device and the destination device; and
5 identifying all Emulated Local Area Networks (ELANs) associated with the subnet.

6 6. (Original) The method as recited in Claim 1, wherein the step of creating and storing
7 a Connected Group Space representation further comprises the steps of:
8 creating one Connected Group node for any pairs of interfaces across a point-to-point
9 link in the topology space representation;
10 creating one Connected Group node for any interfaces of the managed network that
11 are directly connected by virtue of being on a same physical medium;
12 creating one Connected Group node for LAN Emulation interfaces on a same
13 Emulated Local Area Network (ELAN);
14 creating one Connected Group node for each internal interface of any network device
when the network device has an internal interface;
creating one Connected Group node for the source device;
creating one Connected Group node for the destination device; and
creating one Connected Group node for each user interface on any network device
when the network device has a user interface.

1 7. (Original) The method as recited in Claim 6, further comprising the step of
2 determining Connected Group links between Connected Group nodes in a subnet
3 associated with the source device and the destination device.

1 8. (Original) The method as recited in Claim 7, further comprising the step of creating
2 one Connected Group link for each pair of interfaces within each network device,
3 wherein each interface is associated with the subnet of the source device and the
4 destination device and is in a forwarding state.

1 9. (Original) The method as recited in Claim 8, further comprising the step of checking
2 a spanning tree status for each interface within each network device to determine
3 whether the interface is in the forwarding state.

1 10. (Original) The method as recited in Claim 1, wherein the step of identifying an
2 optimized path in the Connected Group Space representation further comprises the
3 step of finding a shortest path between a Connected Group source node and a
4 Connected Group destination node.

1 11. (Original) The method as recited in Claim 10, further comprising the step of using a
2 Dijkstra algorithm to find the shortest path between the Connected Group source node
3 and the Connected Group destination node.

1 12. (Original) The method as recited in Claim 1, wherein the step of transforming the
2 optimized path into the topology space representation further comprises the steps of:

3 identifying an ordered set of Connected Group nodes associated with the optimized
4 path; and
5 identifying an ordered set of Connected Group links associated with the ordered set of
6 Connected Group nodes.

1 13. (Original) The method as recited in Claim 12, further comprising the steps of:
2 identifying a pair of interfaces associated with each Connected Group link in the
3 ordered set of Connected Group nodes associated with the optimized path; and
4 generating an ordered set of topology space links from the pairs of interfaces
5 associated with Connected Group links.

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1 14. (Original) A computer-readable medium carrying one or more sequences of
2 instructions for determining a logical path in a managed network between a source
3 device and a destination device at a data link layer, wherein execution of the one or
4 more sequences of instructions by one or more processors causes the one or more
5 processors to perform the steps of:
6 creating and storing a Connected Group Space representation of network devices
7 based on a topology space representation of the network devices;
8 identifying an optimized path in the Connected Group Space representation;
9 transforming the optimized path into the topology space representation; and
10 creating and storing the optimized path that was transformed into the topology space
11 representation as the data link layer path.

1 15. (Original) The computer-readable medium as recited in Claim 14, wherein the
2 managed network is a managed IP network.

1 16. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 creating and storing a Connected Group Space representation further comprises the
3 steps of:
4 identifying a set of Connected Group nodes associated with the Connected Group
5 Space representation;
6 identifying Connected Group links that connect the Connected Group nodes; and
7 creating and storing information that represents the Connected Group links.

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1 17. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 creating and storing a Connected Group Space representation further comprises the
3 steps of:
4 identifying a subnet associated with the source device and the destination device;
5 determining a set of network links that link one or more network devices in the
6 managed network; and
7 determining an assignment of ports of network devices.

1 18. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 creating and storing a Connected Group Space representation further comprises the
3 steps of:
4 identifying all Virtual Local Area Networks (VLANs) associated with a subnet
5 associated with the source device and the destination device; and

6 identifying all Emulated Local Area Networks (ELANs) associated with the subnet
7 associated with the source device and the destination device.

1 19. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 creating and storing a Connected Group Space representation further comprises the
3 steps of:

4 creating one Connected Group node for any pairs of interfaces across a point-to-point
5 link in the topology space representation;

6 creating one Connected Group node for any interfaces of the managed network that
7 are directly connected by virtue of being on a same physical medium;

8 creating one Connected Group node for LAN Emulation interfaces on a same
9 Emulated Local Area Network (ELAN);

10 creating one Connected Group node for each internal interface of any network device
11 when the network device has an internal interface;

12 creating one Connected Group node for the source device;

13 creating one Connected Group node for the destination device; and

14 creating one Connected Group node for each user interface on any network device
15 when the network device has a user interface.

1 20. (Original) The computer-readable medium as recited in Claim 19, further comprising
2 the step of determining Connected Group links between Connected Group nodes in a
3 subnet associated with the source device and the destination device.

1 21. (Original) The computer-readable medium as recited in Claim 20, further comprising
2 the step of creating one Connected Group link for each pair of interfaces within each
3 network device, wherein each interface is associated with the subnet of the source
4 device and the destination device, and is in a forwarding state.

1 22. (Original) The computer-readable medium as recited in Claim 21, further comprising
2 the step of checking a spanning tree status for each interface within each network
3 device to determine whether the interface is in the forwarding state.

1 23. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 identifying an optimized path in the Connected Group Space representation further
3 comprises the step of finding a shortest path between a Connected Group source node
4 and a Connected Group destination node.

1 24. (Original) The computer-readable medium as recited in Claim 23, further comprising
2 the step of using a Dijkstra algorithm to find the shortest path between the Connected
3 Group source node and the Connected Group destination node.

1 25. (Original) The computer-readable medium as recited in Claim 14, wherein the step of
2 transforming the optimized path into the topology space representation further
3 comprises the steps of:
4 identifying an ordered set of Connected Group nodes associated with the optimized
5 path; and

6 identifying an ordered set of Connected Group links associated with the ordered set of
7 Connected Group nodes.

1 26. (Original) The computer-readable medium as recited in Claim 25, further comprising
2 the steps of:
3 identifying a pair of interfaces associated with each Connected Group link in the
4 ordered set of Connected Group nodes associated with the optimized path; and
5 generating an ordered set of topology space links from the pairs of interfaces
6 associated with Connected Group links.

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1 27. (Original) A computer data signal embodied in a carrier wave, the computer data
2 signal carrying one or more sequences of instructions for determining a logical path
3 in a managed network between a source device and a destination device at a data link
4 layer, wherein execution of the one or more sequences of instructions by one or more
5 processors causes the one or more processors to perform the steps of:
6 creating and storing a Connected Group Space representation of network devices
7 based on a topology space representation of the network devices;
8 identifying an optimized path in the Connected Group Space representation;
9 transforming the optimized path into the topology space representation; and
10 creating and storing the optimized path that was transformed into the topology space
11 representation as the data link layer path.

1 28. (Original) A computer apparatus comprising:
2 a processor; and
3 a memory coupled to the processor, the memory containing one or more sequences
4 of instructions for determining a logical path in a managed network between
5 a source device and a destination device at a data link layer, wherein
6 execution of the one or more sequences of instructions by the processor
7 causes the processor to perform the steps of:
8 creating and storing a Connected Group Space representation of network
9 devices based on a topology space representation of the network
10 devices;
11 identifying an optimized path in the Connected Group Space representation;
12 transforming the optimized path into the topology space representation; and
13 creating and storing the optimized path that was transformed into the
14 topology space representation as the data link layer path.

1 29. (New) The method of claim 1, further comprising the step of monitoring network
2 devices by obtaining information about the network devices from information
3 associated with the data linked path.

1 30. (New) The method of claim 1, further comprising the step of obtaining diagnostic
2 information by obtaining information about the network devices from information
3 associated with the data linked path.

1 31. (New) The method of claim 1, wherein the data link path is a trace of a path
2 determinable from a bridge forwarding table.

1 32. (New) The method of claim 1, wherein the data link path is verifiable by comparing
2 information related to the data link path to information from a bridge forwarding
3 table.

1 33. (New) The computer readable medium of claim 14, wherein the instructions further
2 comprise the step of monitoring network devices by obtaining information about the
3 network devices from information associated with the data linked path.

1 34. (New) The computer readable medium of claim 14, wherein the instructions further
2 comprise the step of obtaining diagnostic information by obtaining information
3 about the network devices from information associated with the data linked path.

1 35. (New) The computer readable medium of claim 14, wherein the data link path is a
2 trace of a path determinable from a bridge forwarding table.

1 36. (New) The computer readable medium of claim 14, wherein the data link path is
2 verifiable by comparing information related to the data link path to information from
3 a bridge forwarding table.
